BANK PROFITABILITY- A STUDY ON THE PRIVATE COMMERCIAL BANKS IN BANGLADESH

By

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A thesis submitted to the Department of Economics and Social Science in partial fulfillment of the requirements for the degree of
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Declaration

It is hereby declared that

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2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
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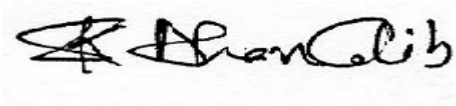

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Approval

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Abstract

The thesis examines the influence of bank-specific variables on bank profitability in Bangladesh for the period, 2014-2018. The sample contains data of the 13 largest private commercial banks which has been chosen on the basis of assets size. The panel data regression models are estimated using bank level annual data from the sample banks. The regression results show that interest income and capital adequacy have positive and statistically significant impact on banks' profitability. On the other hand, increased non-performing loans (NPLs) decrease bank profitability. Therefore, bank should invest in economically viable projects. The monitoring and supervision of the loan portfolio should be strengthened to reduce default loans (NPLs) in order to increase profitability of the banks in Bangladesh. The findings of this study would help the banks' investors, policy makers, other stakeholders and management for improving the performance and decision making of the financial institutions especially banks in coming times.

Acknowledgement

I am grateful to my supervisor, Dr. Iftekhar Ahmed Robin, Department of Economics and Social Sciences, BRAC University whose expertise was invaluable in formulating the thesis paper. His perspective feedback pushed me to polish my thinking and brought my work to a higher level.

In addition, I would like to thank my family for their unconditional support, wise counsel and sympathetic ear. Finally, I might not be able to complete this thesis without the support of my college friend, who provided stimulating discussions as well as happy distractions to rest my mind outside of my thesis.

TABLE OF CONTENTS

List of Figure

List of Tables

1.1 Study Context:

Profitability is a measurement of efficiency. Bank profitability is the most significant topic in research field all over the world in 21st century. In 2008, the world faced a major economic crisis. During this time bank profitability issue has become more relevant when it introduced risk-based capital allocation standards under Basel framework. Bangladesh is dominated by bank in economic sector mostly. Where it has scrutinized in the global trend of those factors drive banks' profitability on an industry and macro-level. In both level profitability plays a vital role. Due to increased competition in the banking sector of Bangladesh, bank profitability has become essential. However, some research has shown the determinant of bank profitability in Bangladesh before. Major shares of them were carried out in the period of high interest rate regime when the demand of loanable funds in Bangladeshi economy was higher compare to the supply for them. The researchers believe a ruling change in the source variables of bank profitability due to the extending of the excess liquidity and the downward sloping yield curve prevailing in the economy. A study should significantly take on this issue under the unstable situation.

Bangladesh became a sovereign country in 16th December, 1971. After the liberation war in 1971 all the banks in Bangladesh were nationalized. The Private State-owned banks and other private banks were allowed for operation in 1981. Currently, the central bank of Bangladesh supervises 9 State Owned banks among them 6 are schedule and 3 are specialized, 33 Conventional Private Commercial Bank, 9 foreign banks, 10 are Shariah-based Islamic banks, 5 non-schedule banks. These banks are currently operating in the financial sector in Bangladesh. Different types of banks offer different types of services. This study focuses on the effects of bank-specific factors on the profitability of the sample banks.

The research outcome will contribute to the concerned stakeholders for example policy maker, investors, regulators and bank management for the required policy measures in the banking sector in Bangladesh.

1.2 Objectives

The objective of the study is to inspect the impact of bank specific factors on the profitability of 13 the largest private commercial banks in Bangladesh for the period 2014 to 2018. Generally, bank profitability is affected by both bank-specific and macroeconomic factors. But this study investigates the bank-specific determinants that impact on banking sector's profitability.

Design/approach: The Return on Asset (ROA) and Net Interest Margin (NIM) are used as profitability measures to determine the effect of bank-specific indicators on profitability. The descriptive and regression analysis results are derived with the help of STATA. The fixed effect model has been used to run the regression analysis among the variables.

Research Question: The thesis examines how the banks specific factors impact on the profitability of 13 largest private commercial banks in Bangladesh for the period 2014-2018. Return on Asset (ROA) and Net Interest Margin (NIM) are considered as the profitability measures.

1. What extent the bank specific factors affect the ROA of the sample banks?
2. What extent the bank specific factors affect the NIM of the sample banks?

Hypothesis of my Research: It is expected that deposit would negatively affect the ROA and NIM. Since deposit is a liability for banks and banks have to pay interest/profit to the depositors. Loans and advances may have positive impact on ROA and NIM since banks earn profits/interest through disbursing loans and advances. Total interest income and non-interest income are the earning variables

for bank. So, it can be assumed this two would positively affect the ROA and NIM. Operating Expense is the expenses for the banks, so that banks always want to reduce the operating expenses, so it is expected that operating expenses would negatively affect the ROA and NIM. Capital Adequacy is the core capital for bank. So, I can assume this variable would positively affect the ROA and NIM.

The significance of profitability analysis of the banks can be valued at both the micro and macro levels of the economy. It is of no doubt that banking sector plays a vital role for the stability of microeconomic & macroeconomic conditions and attaining higher economic growth. On the micro level, profit is an indispensable condition for a sustained and healthy banking institution.

1.3 Structure of the paper:

The thesis is organized in 6 chapters. Following the introductory chapter, which contains the study context, research objectives are significance of the study, Chapter 2 provides a brief literature review of bank profitability. Chapter 3 demonstrates the Empirical Design which contains methodology, data set, model specifications and variables. Chapter 4 presents exploratory analysis. Chapter 5 explains the empirical results and interpretation of the regression results obtained. Chapter 6 discusses the policy implications and conclusion of the thesis.

2.0 Literature Review

There are numerous studies on bank profitability undertaken so far utilizing sample data from different countries. Some are as follows

Bhatia, Mahajan & Chander (2012) and Sufian & Noor (2012) in India; Shoaib, Wang, Jaleel & Peng (2015) in Pakistan; Macit (2012), Alper and Anbar (2011), Alp, Ban, Demirgunes & Kilic (2010) in Turkey; Saeed (2014) in United Kingdom, Liu & Wilson (2010) in Japan; Kosmidou, Tanna, and Pasiouras (2005) Sufian (2011) in South Korea, Sufian & Chong (2008) in Philippines etc. From the perspective of Bangladesh, Abdullah, Parvez & Ayreen (2014), Dey. M (2014), Saimun & Faruque (2015), Sufian & Habibullah (2009), Sufian and Kamaruddin (2012) conducted research on bank profitability.

Saimun & Faruque (2015) investigate 15 Bangladeshi private commercial banks for the periods 2012 to 2016 where they find total interest income, Non-Performing Loan, operating expenses, capital adequacy, asset, and deposits are significant in terms of ROA. Where non-performing loan has negative relation on ROE.

Sufian and Kamaruddin (2012) investigates 31 Bangladeshi banks for the periods 2000-2010 where they find capitalization, non-traditional activities, liquidity, management quality, and assets are important determinants of influencing profitability and they are significantly connected with ROA and ROE.

Dey. M (2014) investigates 15 listed commercial banks in Bangladesh for the periods 2008-2012, where he shows profitability, asset quality, operating performance, bank size and liquidity position are positively connected but profitability and capital adequacy are related negatively.

Sufian and Noor (2012) reveals that operating expenses and liquidity shows a significant result on profitability analyzing the banking sector data in India for the period 2000 to 2008.

Sufian and Habibullah, (2009) examine the determinants of Chinese bank profitability. Both of them find that in Chinese banks' profitability all the determinants have statistically significant. However, these impacts are not uniform among the bank types.

Using Pooled Ordinary Least Square (POLS) method Gul, Irshad and Zaman (2011) recognize bank specific factors over bank profitability by using data of top 15 Pakistani commercial banks over the period 2005-2009. They found assets, loans equity & deposits have positive impact on all 3 profitability indicators i.e., ROA, ROE and NIM.

Saeed (2014) investigates among 73 commercial Banks in UK for the period 2006 to 2012, where he concludes that the effect of bank specific variables on profitability on loan outstanding, capital ratio, amount of liquidity, volume of deposits and interest rate are positively connected with ROA and ROE.

Sufian (2011) uses bank level data of 251 banks of Korea for the period 1992-2003 where he finds a negative impact of liquidity and positive effect of non-interest income on bank profitability. Banks with higher liquidity indicates lower profit concluded by Goddard, Molyneux & Wilson (2014).

Lee and Hsieh (2013) and Menicucci and Paolucci (2016) observe a big number of deposits leads to higher profits. Saeed (2014) found the same result using data 2000 to 2014. On the other hand, Demirguc-Kunt and Huizingal (1998) examine 80 countries bank level data sample from 1988-1995, where they find deposit and profitability has mixed relationship.

Sufian and Chong (2008) inspect the Philippines bank's determinants for the period 1990-2005 where their study recommends the operating expense has

negative impact on ROA & ROE. However, non-interest income & capital has positive results on profitability.

In India, Bhatia, Mahajan & Chander (2012) investigate the private bank's determinants for the periods 2006-2007 to 2009-2010. Applying regression models on 23 sample banks, the study identifies the connection between the determinants with banks performance. The study finds that there has direct impact on Return on Asset (ROA) with Loans and Advances to deposit ratio, and non-interest income to capital adequacy ratio.

Acaravci,S. K. and Çalim, A. E. (2013) described that in case of private commercial banks, the volume of deposits has an insignificant impact on profitability and higher non-performing loans reduces the profitability in general. However, capital adequacy has significant and positive impact on profitability.

By estimating a panel data regression model using bank level data from 78 commercial banks in Latin America region (Argentina, Brazil, Chile, Colombia, Paraguay, Peru and Venezuela) and Mexico for the period 1995 to 2010. Mauricio Jara Bertin, Jose Arias Moya, Arturo Rodriguez Perales (2014) find capital adequacy and profitability are positively connected.

Macit (2012) finds the ratio of non-performing loans to total outstanding loans and advanced has adverse relationship where equity to total ratio has positive results on profitability. They used quarterly data from the sample banks operated between 2005 to 2010 in Turkey.

Demirguc-kunt and Huizinga (1999) finds high volume of equity compared to their assets perform better in banks conserve. This empirical evidence is supported by Ben Naceur and Goied (2008), Garcia-Herrero etal (2009), Pasiouras and Kosmidos (2006), Obamuyi (2013) and Dietrich & Wanzenried (2009).

Alp, Ban, Demrigunes & Kilic (2010) observe there has no statistically significancy between receivables and total loans to total assets ratio.

Growe, De Bruine, Lee and Maldonado (2014) conduct study for the period 1994 to 2011 using the sample data of 15 US regional banks using the Generalized Method of Moments (GMM) estimator technique and finds the non-performing assets has negatively connected to all measures of profitability.

Bonin, Hasan and Wachtel (2005) inspect the impact of 3 ownership variable such as state, strategic foreign and majority foreign which is on bank performance of 11 European transitional countries constructing a panel of 225 banks for the period 1996 to 2000. Actually, the study does not find any significant result specially when ROA is the dependent variable. The real reason is to provide the measure of mixed signals about the performance of bank, it has also given the evolving nature of the banking sector and underdeveloped in transitional economy.

Goddard, Molyneux and Wilson (2004) examine 6 countries of European banks performance where they noticed bank size (based on asset) and profitability has relatively weak relationship which measured by return on equity (ROE). However, British banks shows profitability and off-balance sheet business have a positive relationship.

Angbazo (1997) investigates 11 US banks for the periods 1989 to 1993 and find that Net Interest Margin (NIM) are negatively related with liquidity risk where NIM has positive connection to core capital, non-interest-bearing reserves and management quality.

Molyneux and Seth (1998) analyze in Australia over the period 1989 to 1993 about the financial performance of some foreign banks. The study finds the foreign banks which has full Australian license have a notably lower market share with a return on asset (ROA) that is dependent variable, Where the coefficients

are significantly positive include a foreign banks' home country GDP growth, and the Australian Net Interest Margin (NIM) and non-interest.

Demirguc-IIunt and Huizinga (1999) uses 80 country's bank data for the period of 1988 to 1995 where they examine the bank characteristics and the overall banking environment that impact on Net Interest Margins and bank returns.

3.1 Methodology:

The study estimates a panel data regression model using bank level annual data of 13 largest private commercial banks in Bangladesh for the period 2014-2018. The sample banks are selected on the basis of assets size. I construct a distinctive balanced panel data and estimate the regression model to examine the financial performance of the sample banks in terms of profitability measures, Return on Asset (ROA) and Net Interest margin (NIM). The Hausmann specification test has been undertaken to select the appropriate model for the sample. The test result indicates the Fixed Effect Model is the appropriate one. Therefore, I have selected Fixed Effect Model.

3.2 Model Specification:

The panel data regression Model: $Y_{it} = \alpha + \beta x_{it} + \varepsilon_{it}$.

Where,

Y = Bank's Profitability

X_1 = Total Interest Income

X_2 = Non-Interest Income.

X_3 = Operating Expense

X_4 = Total Deposit

X_5 = Asset Quality

X_6 = Total Asset (Asset Size)

X_7 = Capital Adequacy

3.3 Data:

The sample constitutes data of the largest 13 private commercial banks in Bangladesh that contain more than 45 percent of the total asset of the private commercial banks as of December, 2018. The data has been collected from the balance sheet, income statement and other financial statements of the sample banks and also from the central bank of Bangladesh (Bangladesh Bank). The data set is well constructed logarithm data set (appendix II). The panel data set has been constructed from the balance sheets, income statements and other financial statements of the sample banks.

3.4 Variables:

Dependent Variables: Profitability is the most significant parameter to measure financial performance of banks. Here considering two measures of profitability as dependent variables, they are as follows

- Return on Assets (ROA)
- Net Interest Margin (NIM)

Return on Assets (ROA) shows how much profit a bank can bring on from its assets. ROA also measures how efficiently a bank's management can create earnings from their economic resources on their balance sheet.

The Net Interest Margin (NIM) provides the comparison of the net interest income of a financial institution which generates from loans and mortgages, with the outgoing interest that pays holders of savings account or deposit holders. NIM actually calculating bank's profit.

Independent Variables: The study considers seven independent variables for the model.

The variables are noted in the table below.

Table 01: List of Variables

Variables	Measures
Dependent Variables	
ROA	Net Profit after tax/Total Asset
NIM	Net Interest Margin/Total Asset
Independent Variables	
TII	Total Interest Income
NII	Non-Interest Income
OE	Operating Expenses
TD	Total Deposits
Asset Quality (AQ)	Non-performing Loans/Total Loans and Advanced
Capital Adequacy (CA)	Capital/Risk Weighted Asset
SIZE	Total Assets

Definition of the Variables:

Here two independent variables, Total Interest Income and Non-Interest Income represent as earning. Total Interest Income has generated revenue from loans and advanced. Commission and fees, Investment Income, foreign exchange profit and other income are Non-interest Income, which are divided by total assets for identifying the segment of every income to asset. To calculate the efficiency measurement here operating expenses has used in regression. Total operating expenses are also divided by total asset. Here, non-performing loans to loans and

advanced shows as NPL. More NPL ratio shows bad scenario of banks. These loans are not generating any return where it needs to keep provision against them. Higher equity in terms of asset shows how well capitalized the bank is. High capital ratio means here has some threat of low risk compare to banks with lower capital ratio. Capital high indicates shareholders are active in their performance. In long run, capitalized bank with high capital is able to impact absorption from different risk factors where they perform well. In banking industry, total deposits are the vital sources of funding. A bank with high deposit disburses more loans and advanced. The size variable has taken from the natural logarithm of total assets. Because of economic of scale the large size banks have the possible cost advantages. For this reason, Size variable may have positive impact on bank profitability. Total loans and advanced are the key source of earnings for banks. So, more loans and advanced can generate more income for a bank. Here for sample banks all the variables are extensive variables such as total loans or total assets which create a well-balanced data.

Exploratory Analysis of banks in Bangladesh

On the basis of Asset size in the year of 2018 I have catagoried 3 groups among the 13 sample banks. The banks whose asset size is more than 350000 million BDT are named as Group A, and the banks are National Bank Limited, Pubali Bank Limited, South East Bank Limited, United Commercial bank Limited and BRAC Bank Limited. The banks whose asset size stand between 300000 million BDT to 350000 million BDT are named as Group B. and they are AB bank, Bank Asia, Dutch Bangla Bank Limited and The City Bank. And rest of the four banks are named as Group C. (IFIC bank, Eastern Bank Limited, Prime Bank Limited and Mercantile bank Limited). The growth trend of these three categories of the banks for the period 2014-2018 are shown below.

Asset Structure:

Figure 3.1 demonstrates the group wise trend in assets structure of the sample banks over the period, 2014-2018. The figure reveals that in Group B, bank's Asset size gradually decreasing after 2015. Whereas in group C, banks' asset size dramatically increases in 2018. In Group A, Banks have similar percentage of asset during the periods. That means in Group A, banks are stable in Asset Size.

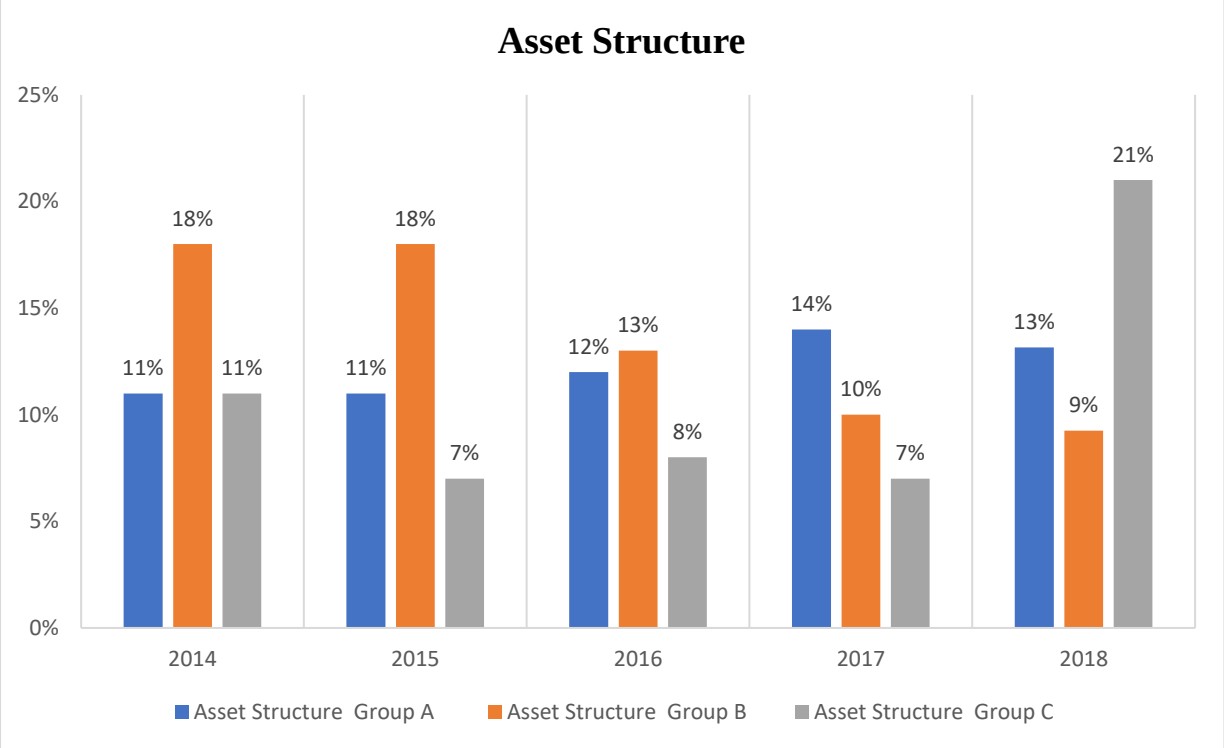


Figure 3.1: Group Wise Trend in Assets, 2014-2018

Loans and Advanced:

Loans and advances are the life blood of a bank because this is the earning unit of the bank. More loans and advanced indicates more profit for bank.

Figure 3.2 illustrates that under Group A, banks have shown increasing trend among the years except 2018. Where in Group B, banks have shown decreasing trend among the years. But under Group C, banks have shown fluctuating percentage ratio of loans and advanced during the periods.

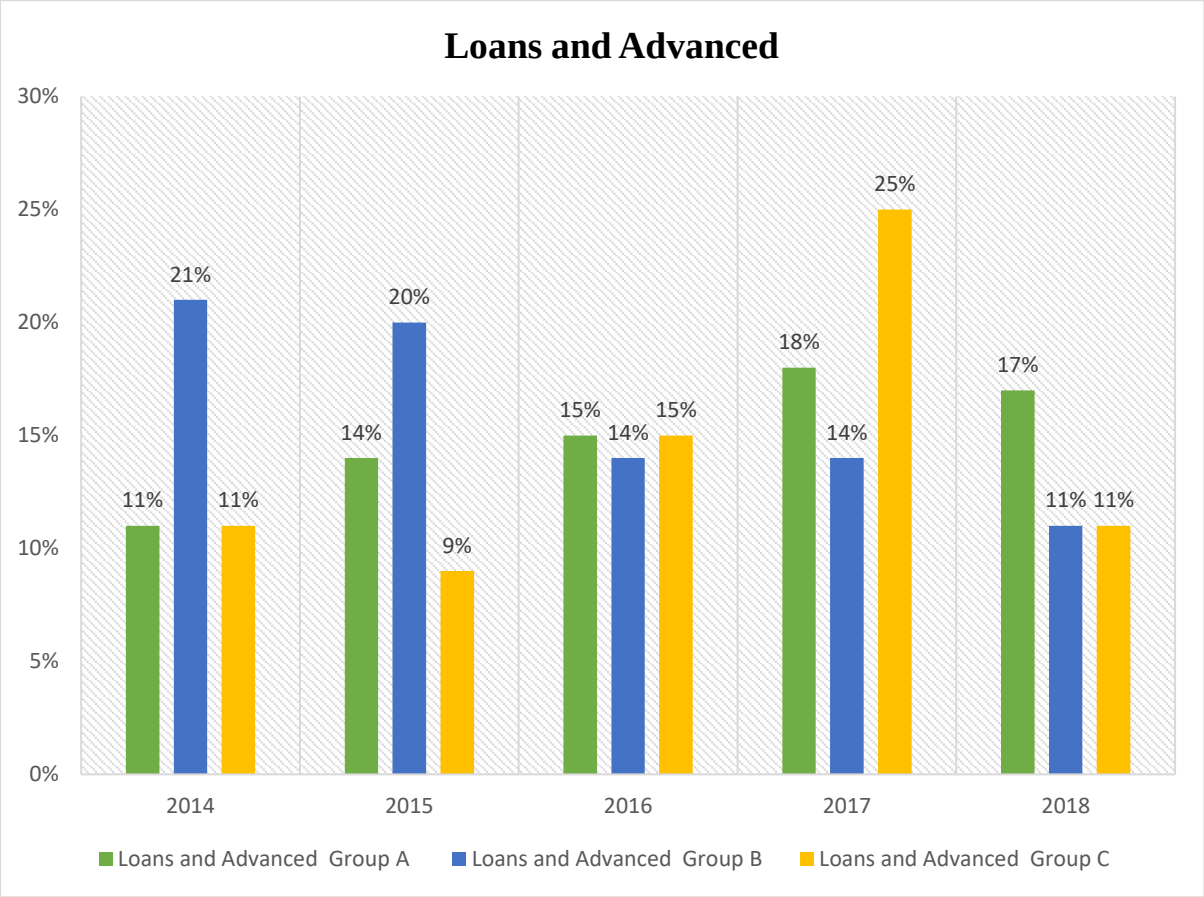
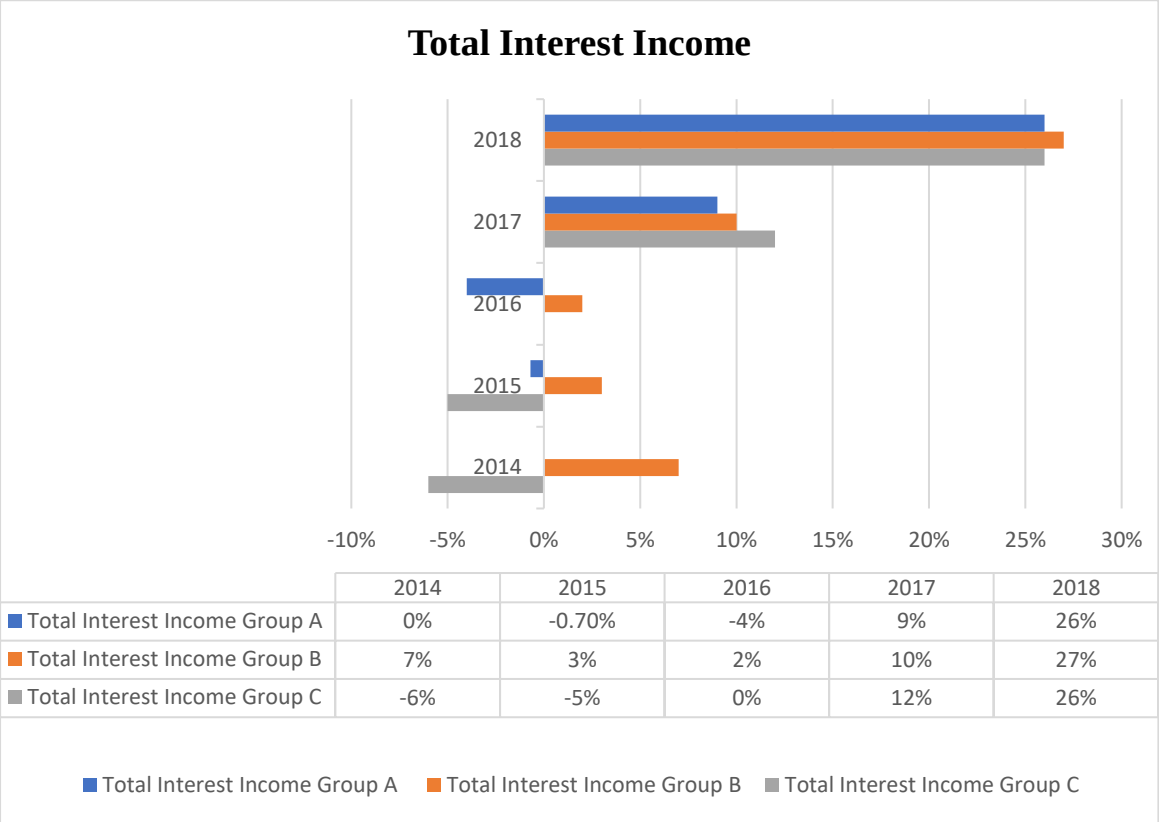


Figure 3.2: Group Wise Trend in Loans and Advances, 2014-2018

Total Interest Income:

A basic measure of earnings is interest income for financial institutions especially for banks.

Figure 3.3 demonstrates that in 2018 all groups of banks were able to increase their interest income. Among them, in Group B banks earned the highest percentage of Interest income. So, it can be said that in 2018 almost all Group of sample banks have heavy dependence on total interest income.



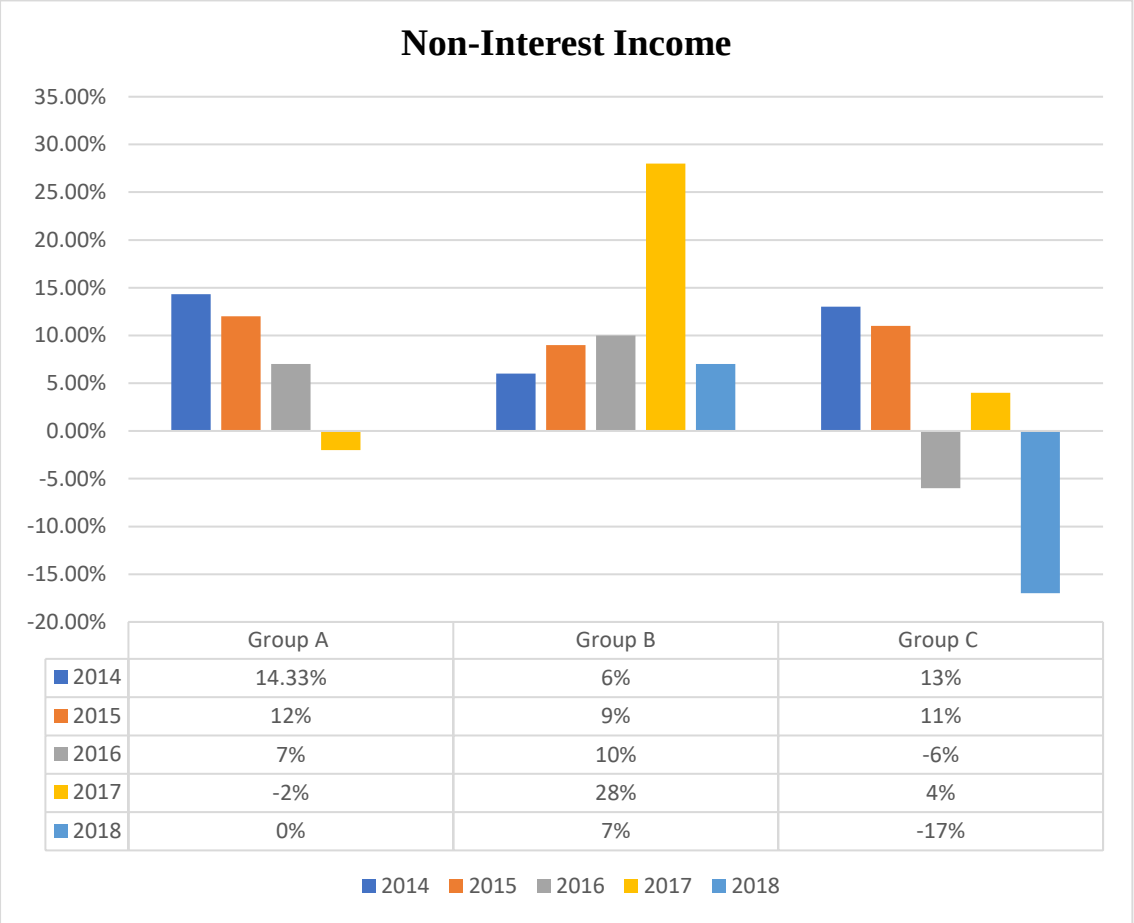
	2014	2015	2016	2017	2018
Total Interest Income Group A	0%	-0.70%	-4%	9%	26%
Total Interest Income Group B	7%	3%	2%	10%	27%
Total Interest Income Group C	-6%	-5%	0%	12%	26%

Figure 3.3: Group Wise Trend in Interest Income, 2014-2018

Non-Interest Income:

Non-interest income is another source of earnings for banks that earned primarily from fees including transaction and deposit fees, insufficient funds (NSF), annual fees, monthly account service charges, inactivity fees, check and deposit slip fees, L/C opening and so on.

Figure 3.4 shows that in Group A, banks have decreasing trend over the years. In Group B, banks have an increasing trend during the years except 2018. But in Group C, the non interest income's percentage of the banks are fluctuating over the years.



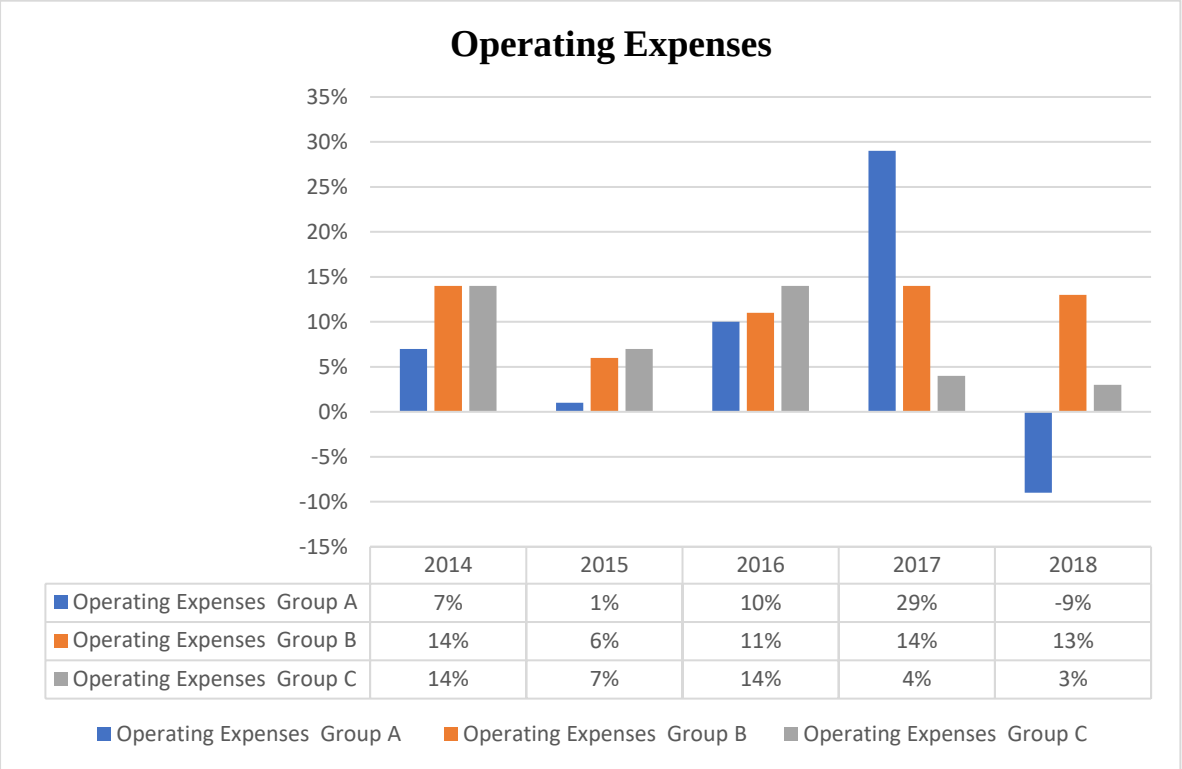
	Group A	Group B	Group C
2014	14.33%	6%	13%
2015	12%	9%	11%
2016	7%	10%	-6%
2017	-2%	28%	4%
2018	0%	7%	-17%

Figure 3.4: Group Wise Trend in Non-interest income, 2014-2018

Operating Expenses:

Operating Expenses are most obvious and unpreventable cost for bank. Some banks control their operating expenses by reducing it, the main purpose of reducing operating expenses is to achieve a competitive advantage and increase income. Nevertheless, decreasing operating expenses may also compromise the integrity and quality of operations. Right balance can be difficult to find but it has yield remarkable prize.

Figure 3.5 shows that all the groups of banks have both positive and negative percentage of operating expenses. In 2017 Group A, banks have the highest percentage of operating expenses. However, the group A banks successfully reduce the percentage in the next year. In Group B and C, banks have positive percentage of operating expenses and they are fluctuating over the years.



	2014	2015	2016	2017	2018
Operating Expenses Group A	7%	1%	10%	29%	-9%
Operating Expenses Group B	14%	6%	11%	14%	13%
Operating Expenses Group C	14%	7%	14%	4%	3%

Figure 3.5: Bank Wise Trend in Operating expenses, 2014-2018

Deposit Mobilization:

Deposits are the liability for a bank. Bank deposits consist of money placed into banking institutions for safekeeping.

Figure 3.6 shows the trend in deposit mobilization by the sample banks over the period, 2014-2018. The figure reveals that total deposits of all the groups are fluctuating over the years. It has been observed, all the groups' banks have sufficient percentage of deposits during the periods.

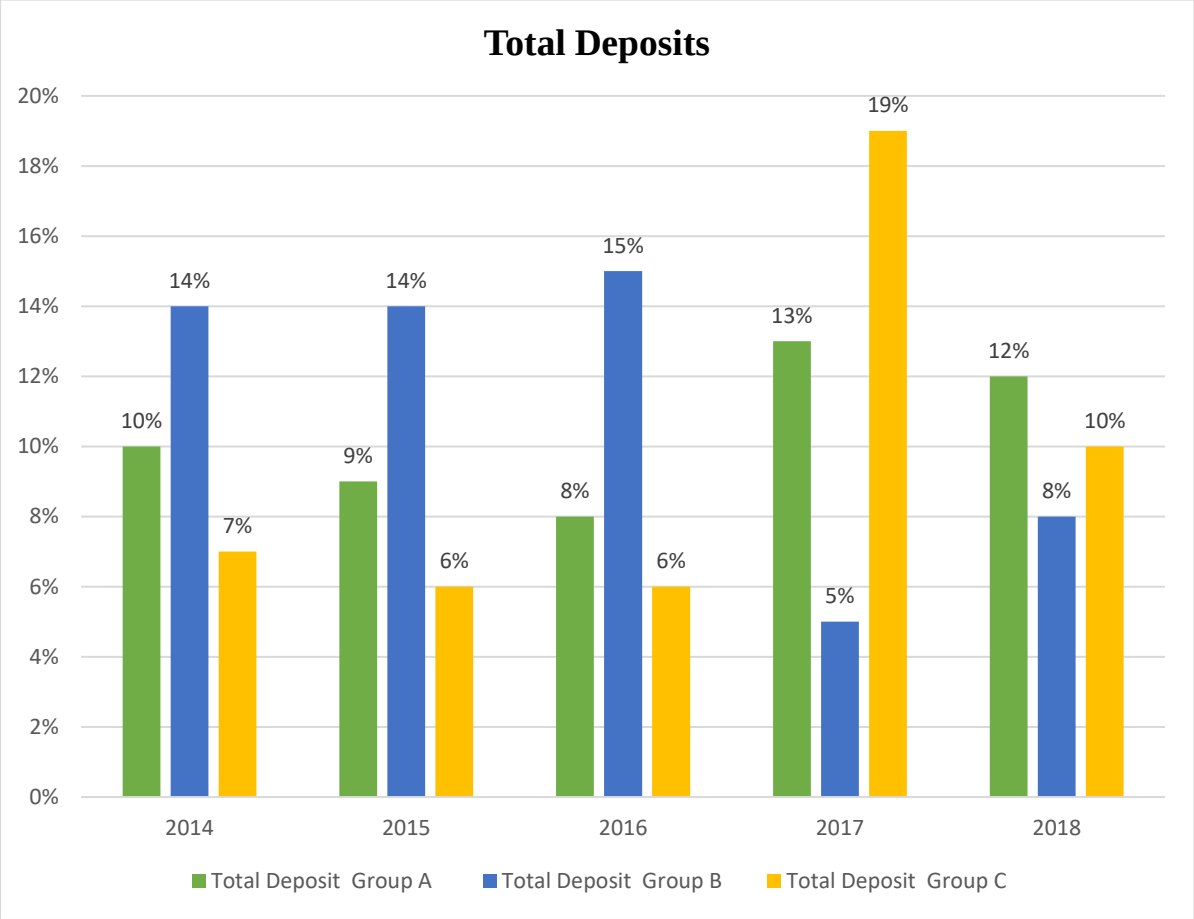
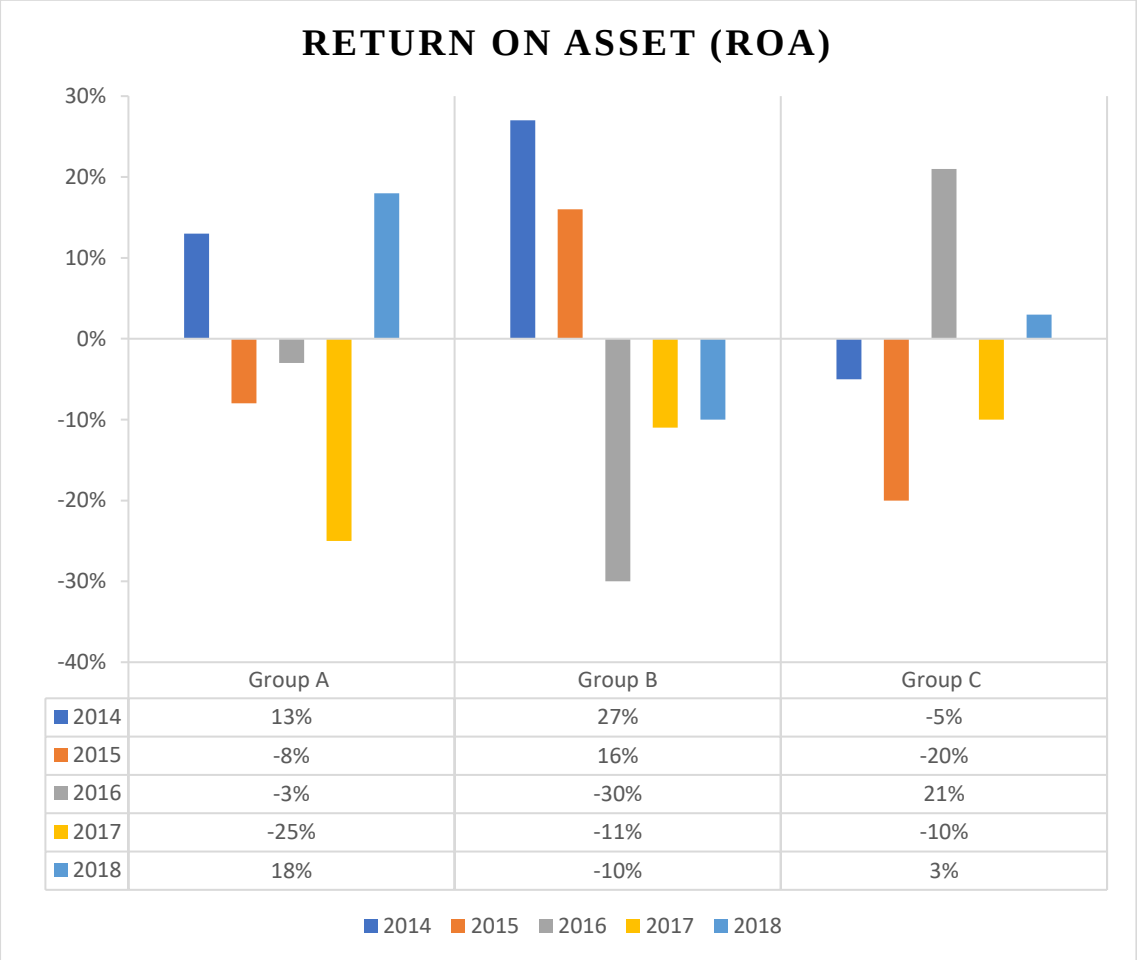


Figure 3.6: Group Wise Trend in Deposits, 2014-2018

Return On Asset (ROA):

Return on assets (ROA) is an indicator for measuring profitability of a bank. ROA indicates efficiency of bank's management which is using its asset to generate earnings. ROA shows how a company utilizes its assets in terms of profitability.

Figure 3.7 reveals that Group A, banks have got positive ratio of ROA in 2014 and 2018. However, the rest of the years the ratios were negative. In Group B, banks have got positive ratio of ROA in 2014 and 2015. However, the rest of the years the ratios were negatives. Whereas, in Group C, banks have got positive ratio in 2016 only. Rest of the years banks has got negative ratio of ROA.



	Group A	Group B	Group C
2014	13%	27%	-5%
2015	-8%	16%	-20%
2016	-3%	-30%	21%
2017	-25%	-11%	-10%
2018	18%	-10%	3%

Figure 3.7: Group Wise Trend in ROA, 2014-2018

Net Interest Margin (NIM):

Net interest margin is the profitability indicator that approximates the likelihood of a bank or investment company thriving over the long haul. Prospective investors determine this metric to help whether or not to invest in a given financial services firm by providing visibility into the profitability of their interest income versus their interest expenses.

Figure 3.8 shows, in 2014 only Group B, banks have got positive ratio of NIM. In 2015 all the Groups have got negative ratio of NIM. Whereas in 2016 and 2018, only Group C banks have the positive ratio of NIM. But 2017, Group A and Group B banks have got the positive ratio of NIM.

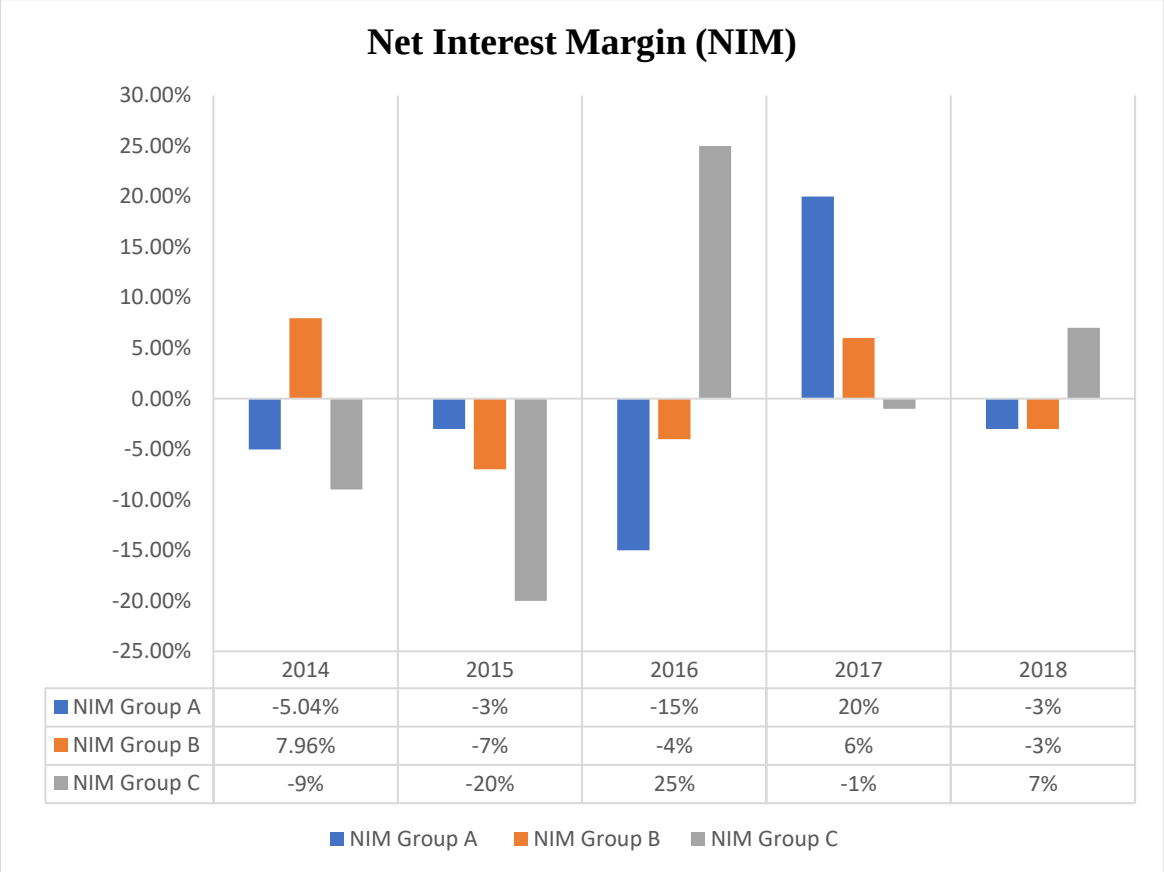


Figure 3.8: Group Wise Trend in NIM, 2014-2018

5.1 Empirical Models

Model 1: $Y_{ROA} = \alpha + \beta_{TII} + \beta_{NII} + \beta_{OE} + \beta_{TD} + \beta_{AQ} + \beta_{TA} + \beta_{CA} + \varepsilon$..... (1)

Model 2: $Y_{NIM} = \alpha + \beta_{TII} + \beta_{NII} + \beta_{OE} + \beta_{TD} + \beta_{AQ} + \beta_{TA} + \beta_{CA} + \varepsilon$..... (2)

Where,

TII = Total Interest Income

NII = Non interest Income

OE = Operating Expense

TD = Total Deposit

AQ = Asset Quality

TA= Total Asset (Bank Size)

CA= Capital Adequacy

5.2 Empirical Result

The table 2 describes different variable's minimum maximum value with standard error and mean value. This table contains a summary of Descriptive statistics of variables estimated.

Table 2: Descriptive Statistics of Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
bank	65	7	3.770776	1	13
year	65	3	1.425219	1	5
roa	65	.0100985	.0046217	-.0008	.02
nim	65	.0844846	.1647817	.0086	.695
ti	65	4.106969	.3090243	3.245	4.449
ni	65	3.554585	.3470917	2.784	4.088
oe	65	3.813446	.174281	3.522	4.269
td	65	5.300323	.1030745	5.067	5.499
aq	65	.0587538	.0383491	.024	.331
ta	65	5.4236	.1024664	5.194	5.613
ca	65	.7758308	.0165081	.743	.812

As it shows from the table 3 for return on asset (ROA), three variables were found as significant, at significance level of 1%, 5% and 10%. Total interest income that is positively related to ROA which is statistically significant. Total deposit is negatively related with ROA and strongly significant. Capital Adequacy is also positively related with ROA and statistically significant.

Table 3: Fixed Effect Model Result on ROA

```
. xtreg roa ti ni oe td aq ta ca, fe

Fixed-effects (within) regression               Number of obs      =        65
Group variable: bank                            Number of groups   =        13

R-sq:                                           Obs per group:
     within = 0.3243                                         min =         5
     between = 0.5645                                        avg =       5.0
     overall = 0.3854                                        max =         5
                                                             F(7,45)           =      3.09
corr(u_i, Xb)  = -0.9116                        Prob > F          =    0.0096

------------------------------------------------------------------------------
         roa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ti |   .0186086   .0098994     1.88   0.067    -.0013298    .0385471
          ni |   .0077755   .0069371     1.12   0.268    -.0061964    .0217475
          oe |   -.001096   .0134705    -0.08   0.936     -.028227    .0260349
          td |  -.0342811   .0205545    -1.67   0.102    -.0756799    .0071177
          aq |  -.0105055   .0124122    -0.85   0.402     -.035505     .014494
          ta |   .0049821   .0174018     0.29   0.776     -.030067    .0400312
          ca |   .1805585   .0561586     3.22   0.002     .0674492    .2936678
       _cons |  -.0745714   .0536193    -1.39   0.171    -.1825663    .0334234
-------------+----------------------------------------------------------------
     sigma_u |  .00640193
     sigma_e |  .00307251
         rho |  .81278483   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(12, 45) = 2.01                     Prob > F = 0.0454
. est store a
```

As can be hypothesized from general economic theory, the statistically significant predictor variables, the earning variables (Total Interest Income), and the capital adequacy have a positive relationship with the dependent variable. Another

earning variables (noninterest income) and asset size have a positive relationship with ROA but statistically insignificant. On the contrary Operating expense, total deposit and asset quality have negative impact on ROA. Whereas, operating expenses and asset quality statistically insignificant.

Table 4: Hausman Test Result of ROA

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	a	b	Difference	S.E.
ti	.0186086	.0046151	.0139935	.009569
ni	.0077755	.0010044	.0067711	.0066108
oe	-.001096	.0019193	-.0030154	.0127494
td	-.0342811	-.0268444	-.0074368	.0142944
aq	-.0105055	-.0133767	.0028712	.0052239
ta	.0049821	.0103289	-.0053467	.010054
ca	.1805585	.1320125	.0485459	.0421299

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 4.23
Prob>chi2 = 0.7526

As presented in table 4 above, in the Hausman test the null hypothesis is rejected (because the result found here as insignificant) which verified that the fixed effect model can be used for this study.

Model 1: Equation 1: both random effect (RE) and fixed effect model (FE) are estimated. Table 5 demonstrates the regression results obtained from estimating the model 1. The Hausmann specification test is performed to choose which model is appropriate for represent the sample data. The test result indicates the **Fixed Effect Model** is the appropriate one.

Table 5: ROA as Dependent Variable

ROA	Co-efficient	Standard Error
Total Interest Income (TII)	0.019 **	0.010
Non-Interest Income (NII)	0.008	0.007
Operating Expenses (OE)	-0.001	0.013
Total Deposit (TD)	-0.034 *	0.021
Asset Quality (AQ)	-0.011	0.012
Asset Size (TA)	0.005	0.017
Capital Adequacy (CA)	0.181 ***	0.056

Source: author's estimation using STATA

Note: * = 10% level of significance, ** = 5% level of significance, *** = 1% level of significance

Model 1: The estimated statistically significant co-efficient for total interest income indicates that interest income has a positive and significant impact on profitability in terms of ROA. Similarly, capital adequacy has a positive and significant effect on banks' profitability. However, the negative and statistic significant co-efficient for total deposit indicates that an increase in total deposits decreases the ROA. One possible reason is that increased interest payment on bank deposits decreases interest income and eventually banks' profit decreases.

Saimum & Faruque (2015) got the similar result in Capital Adequacy and total interest income as I got in my result. Sufian (2011) and Sufian & Chong (2008) found similar result in non-interest income as I got in my result. Here, in my result operating expenses is negatively impact on ROA Sufian and Chong (2008) found similar result in their case of operating expenses. Gul, Irshad and Zaman (2011) found assets have positive impact on ROA that I have found in my test as well.

As it shows from the table 6 for Net Interest Margin (NIM), two variables were found as significant, at significance level of 1%, and 10%. Operating expense that is positively significant with NIM, normally operating expenses increase means low profit for bank, and NIM calculating the profit, so it should have negatively correlated. So here the result is ambiguously determined. Asset quality that is also significant but negatively significant with NIM. That means the result is at correct manner.

Table 6: Fixed-effects Model of NIM

```
. xtreg nim ti ni oe td aq ta ca, fe
Fixed-effects (within) regression               Number of obs      =        65
Group variable: bank                            Number of groups   =        13

R-sq:                                           Obs per group:
     within  = 0.2655                                         min =         5
     between = 0.0390                                         avg =       5.0
     overall = 0.0435                                         max =         5
                                                F(7,45)           =      2.32
corr(u_i, Xb)  = -0.0930                        Prob > F          =    0.0411

------------------------------------------------------------------------------
         nim |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ti |   .1035831   .0811212     1.28   0.208    -.0598033    .2669695
          ni |  -.0048213   .0568461    -0.08   0.933    -.1193153    .1096727
          oe |   .1853891   .1103844     1.68   0.100    -.0369366    .4077148
          td |  -.0758843   .1684346    -0.45   0.654     -.415129    .2633603
          aq |   -.227009   .1017125    -2.23   0.031    -.4318686   -.0221494
          ta |  -.1084324   .1426002    -0.76   0.451     -.395644    .1787792
          ca |   .6503197   .4601945     1.41   0.164    -.2765596    1.577199
       _cons |  -.5316563   .4393859    -1.21   0.233    -1.416625    .3533124
-------------+----------------------------------------------------------------
     sigma_u |  .16572659
     sigma_e |  .02517786
         rho |  .97743978   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(12, 45) = 172.82                     Prob > F = 0.0000
. est store a
```

As can be hypothesized from general economic theory, one earning variable Total interest income found as positive but statistically insignificant. Whereas another earning variable noninterest income is negatively related to NIM. But statistically insignificant. Total deposits and asset size have negative impact on NIM but statistically insignificant. Capital Adequacy has a positive impact on NIM but statistically insignificant.

Table 7: Hausman Test Result of NIM

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	a	b	Difference	S.E.
ti	.1035831	.0798753	.0237078	.0390918
ni	-.0048213	-.0187412	.0139198	.0253536
oe	.1853891	.2042628	-.0188737	.0424297
td	-.0758843	-.0674617	-.0084226	.0546758
aq	-.227009	-.2313279	.0043189	.0305414
ta	-.1084324	-.1052911	-.0031413	.0434903
ca	.6503197	.6035176	.0468021	.1498018

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 0.64

Prob>chi2 = 0.9987

As presented in table 7 above, in the Hausman test the null hypothesis is rejected (because the result found here as insignificant) which has verified that the fixed effect model can be used for this study.

Model 2: Equation 2: both random effect (RE) and fixed effect model (FE) are estimated for the model 2. Table 8 demonstrates the regression results obtained from estimating the model 2. The Hausmann specification test is performed to choose which model is appropriate for represent the sample data. The test result indicates the **Fixed Effect Model** is the appropriate one.

Table 8: NIM as Dependent Variable

NIM	Co-efficient	Standard Error
Total Interest Income (TII)	0.103	0.081
Non-Interest Income (NII)	-0.004	0.057
Operating Expenses (OE)	0.185 *	0.110
Total Deposit (TD)	-0.075	0.168
Asset Quality (AQ)	-0.227 ***	0.101
Asset Size (TA)	-0.108	0.142
Capital Adequacy (CA)	0.650	0.460

Source: author's estimation using STATA

Note: * = 10% level of significance, ** = 5% level of significance, *** = 1% level of significance.

Model 2: The estimated negative and highly significant co-efficient for the asset quality indicates that increased non-performing loans (NPL_s) decrease the profitability of banks in terms of NIM. However, operating expenses has a positive and significant impact on NIM.

Sufian and Noor (2012) found operating expenses is significantly impact on NIM as profitability measure where my result also reveals the similar outcome. Angbazo (1997) examined NIM has positive connection to core capital (Capital Adequacy) where, my result has shown NIM has positive impact on capital adequacy. Acaravci,S. K. and Çalim, A. E. (2013) described that in case of private commercial banks, the volume of deposits has an insignificant impact on NIM and higher non-performing loans reduces the profitability in general. However, capital adequacy has positive impact on NIM, that I have actually shown in my results as well.

5.3 Comparison of the two models:

In the first model total interest income that is positively related to ROA and statistically significant. Whereas in the second model total interest income has positive impact on NIM but statistically insignificant.

Non-interest income has positive impact on ROA in the first model but it has negative impact on NIM in the Second model. In both models' coefficients for non-interest income have shown statistically insignificant.

Operating expenses have negative impact on ROA and statistically insignificant whereas in the second model it has positive impact on NIM and it is statistically significant.

Total deposit has negative impact on ROA and estimated coefficient is statistically significant. Whereas it has negative impact on NIM but statistically insignificant.

Asset Quality has negative impact on ROA and NIM. But the estimated co-efficient for asset quality is statistically insignificant in the first model and in the second model asset quality is statistically significant.

Asset Size has positive impact on ROA and negative impact on NIM. In the both models estimated co-efficient of asset size are insignificant.

In the both models Capital Adequacy is positively related to ROA and NIM. But only ROA is statistically significant.

6.0 Conclusion and Policy Implications:

The thesis examines the consequence of bank specific variables on the profitability of the largest 13 private commercial banks in Bangladesh in terms of profitability measures, ROA and NIM. I construct a balanced panel data set comprising the bank level annual data from the balanced sheets and income statements of the sample banks for the period 2014-2018. The Hausman specification test is performed to select which model is appropriate for representing the sample data. The test result indicates the Fixed Effect Model is the appropriate one.

The regression results show that interest income and capital adequacy have positive and significant impact on banks' profitability. On the contrary, increased non-performing loans (NPLs) decrease bank profitability. The results have demonstrated that the study is very much policy relevant and long-term adjustment is needed for the variables to improve the profitability. The study also reveals that banks have heavy dependence on the total interest income to improve their profitability.

Banks do not make planned loan disbursement and have minimal focus towards maximizing return through Balance Sheet management strategies. So, banks should look forward to make a well-planned loan disbursement.

Therefore, bank should invest in economically viable projects. The monitoring and supervision of the loans should be strengthened to reduce default loans (Non-Performing Loans) in order to increase profitability of the sample banks in Bangladesh.

Limitation:

In this thesis several estimated co-efficient have been found statistically insignificant. This limitation may be overcome if I could have a large sample size. Therefore, further research can be undertaken in this area employing a large data set to obtain better result. Furthermore, technological changes and eventually productivity increase could be considered in future research.

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Appendix I

List of Commercial Banks of Bangladesh included in this study in million

Serial No	Bank Name	Asset Size in BDT Core as of 2018	Size as a % of PCB* Sector Size
1	AB Bank	32258.61	3.30%
2	Bank Asia	30731.33	3.15%
3	BRAC Bank	31554.41	3.22%
4	Dutch Bangla Bank limited	34645.00	3.50%
5	National Bank Limited	40708.79	4.20%
6	Pubali Bank	40990.63	4.20%
7	Southeast bank	38105.79	3.90%
8	The City Bank	32488.41	3.33%
9	United Commercial Bank Limited	40107.64	4.10%
10	Mercantile Bank Limited	29138.56	2.98%
11	Prime Bank Limited	29390.07	3.00%
12	Eastern Bank Limited	28273.35	2.89%
13	IFIC Bank	28526.03	2.90%
	Total	436,918.62	45%
		976970	

**Private Conventional Commercial Banks (PCBs),*

Source: Annual Reports of the Sample Banks,

Source: Annual Report of Bangladesh Bank, 2014-2018

Appendix II Panel Data Set

Bank Name	Year	ROA	NIM	Logarithm of TII	Logarithm of NII	Logarithm of OE	Logarithm of TD	logarithm of NPL/Loans and Advanced	Logarithm of total Assests	Logarithm of Capital Adequacy Ratio
1	1	0.0001	0.059	3.292	2.828	3.746	5.372	0.331	5.509	0.743
1	2	0.0001	0.085	3.245	2.825	3.769	5.373	0.071	5.498	0.753
1	3	0.004	0.0901	3.282	2.917	3.778	5.39	0.052	5.498	0.758
1	4	0.005	0.1501	3.32	2.805	3.75	5.33	0.032	5.455	0.762
1	5	0.005	0.247	3.33	2.784	3.719	5.297	0.039	5.392	0.751
2	1	0.008	0.0426	4.32	3.592	3.783	5.347	0.041	5.488	0.774
2	2	0.008	0.0363	4.215	3.587	3.723	5.316	0.044	5.461	0.766
2	3	0.007	0.0364	4.163	3.495	3.674	5.282	0.054	5.403	0.762
2	4	0.013	0.0303	4.144	3.436	3.636	5.23	0.043	5.351	0.769
2	5	0.013	0.0426	4.143	3.388	3.592	5.149	0.053	5.262	0.768
3	1	0.019	0.043	4.4	3.429	4.015	5.359	0.031	5.554	0.801
3	2	0.02	0.0435	4.312	3.474	3.985	5.293	0.035	5.489	0.79
3	3	0.019	0.0435	4.251	3.425	3.9	5.228	0.034	5.429	0.779
3	4	0.011	0.039	4.24	3.476	3.862	5.177	0.059	5.365	0.783
3	5	0.011	0.037	4.225	3.428	3.822	5.172	0.056	5.322	0.787
4	1	0.013	0.693	4.332	3.757	4.187	5.419	0.041	5.54	0.775
4	2	0.009	0.695	4.218	3.698	4.108	5.369	0.047	5.494	0.773
4	3	0.007	0.637	4.187	3.591	4.017	5.316	0.052	5.423	0.772
4	4	0.013	0.611	4.205	3.575	3.962	5.271	0.037	5.387	0.77
4	5	0.011	0.548	4.182	3.55	3.963	5.222	0.044	5.334	0.762
5	1	0.011	0.017	4.449	3.935	3.813	5.499	0.095	5.61	0.801
5	2	0.014	0.018	4.353	3.983	3.762	5.436	0.106	5.545	0.799
5	3	0.019	0.013	4.278	4.088	3.745	5.383	0.104	5.485	0.803
5	4	0.014	0.0104	4.29	4.006	3.683	5.347	0.07	5.45	0.799
5	5	0.011	0.016	4.314	3.925	3.763	5.308	0.053	5.409	0.781
6	1	0.008	0.0275	4.38	2.916	3.924	5.49	0.055	5.613	0.778
6	2	-0.0008	0.0258	4.279	2.919	3.903	5.434	0.087	5.566	0.78
6	3	0.004	0.0275	4.246	2.833	3.869	5.393	0.054	5.506	0.781
6	4	0.01	0.029	4.267	2.856	3.819	5.352	0.053	5.456	0.786
6	5	0.012	0.0251	4.236	2.93	3.803	5.286	0.063	5.395	0.782
7	1	0.007	0.0318	4.38	3.666	3.714	5.475	0.059	5.582	0.771
7	2	0.004	0.0342	4.241	3.637	3.688	5.431	0.06	5.531	0.765
7	3	0.009	0.0377	4.23	3.552	3.638	5.362	0.049	5.465	0.775
7	4	0.012	0.0392	4.25	3.519	3.553	5.323	0.043	5.416	0.782
7	5	0.017	0.0396	4.284	3.5	3.522	5.278	0.036	5.374	0.78
8	1	0.007	0.041	3.964	3.687	3.965	5.312	0.053	5.512	0.77
8	2	0.014	0.043	3.875	3.666	3.906	5.264	0.054	5.44	0.804
8	3	0.017	0.044	3.811	3.501	3.836	5.242	0.06	5.406	0.799
8	4	0.019	0.048	3.741	3.461	3.785	5.158	0.076	5.323	0.812
8	5	0.014	0.061	3.709	3.419	3.732	5.075	0.059	5.237	0.804
9	1	0.007	0.023	4.403	3.969	4.269	5.473	0.068	5.603	0.763
9	2	0.007	0.025	4.323	3.926	4.24	5.444	0.074	5.56	0.765
9	3	0.008	0.0262	4.319	3.887	4.213	5.411	0.08	5.518	0.767
9	4	0.014	0.0263	4.351	3.893	4.192	5.344	0.052	5.468	0.768
9	5	0.015	0.03	4.349	3.862	4.182	5.324	0.046	5.425	0.764
10	1	0.011	0.031	4.376	3.639	3.74	5.387	0.048	5.464	0.751
10	2	0.013	0.0292	4.281	3.752	3.723	5.343	0.038	5.415	0.756
10	3	0.012	0.0343	4.219	3.61	3.752	5.218	0.051	5.31	0.761
10	4	0.008	0.0327	4.23	3.445	3.603	5.19	0.05	5.262	0.765
10	5	0.008	0.0382	4.224	3.419	3.555	5.148	0.051	5.227	0.754
11	1	0.008	0.0362	4.265	3.72	3.856	5.296	0.062	5.468	0.786
11	2	0.004	0.0256	4.169	3.861	3.831	5.299	0.054	5.258	0.778
11	3	0.008	0.0202	4.146	3.94	3.797	5.297	0.06	5.435	0.775
11	4	0.008	0.0086	4.192	4.033	3.79	5.29	0.078	5.427	0.785
11	5	0.009	0.0191	4.266	3.956	3.76	5.311	0.076	5.43	0.782
12	1	0.012	0.0266	3.875	3.751	3.778	5.3	0.024	5.451	0.781
12	2	0.01	0.023	3.759	3.823	3.749	5.224	0.025	5.403	0.795
12	3	0.013	0.0261	3.743	3.775	3.704	5.147	0.027	5.325	0.795
12	4	0.012	0.019	3.55	3.803	3.671	5.107	0.033	5.278	0.799
12	5	0.013	0.023	3.603	3.777	3.625	5.067	0.044	5.236	0.799
13	1	0.006	0.02	4.278	3.647	3.708	5.355	0.062	5.452	0.772
13	2	0.009	0.029	4.174	3.63	3.728	5.301	0.064	5.404	0.772
13	3	0.007	0.027	4.099	3.614	3.705	5.205	0.053	5.295	0.747
13	4	0.005	0.026	4.102	3.633	3.643	5.167	0.065	5.251	0.753
13	5	0.011	0.028	4.074	3.624	3.646	5.113	0.049	5.194	0.746

A well-constructed Logarithmic transformation of the data set.